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ABSTRACT

The glossary of approximately 700 energy-related terms provides a useful resource to K-12 classroom teachers and curriculum developers for teaching basic energy concepts and skills. In addition, developers of the glossary suggest that it can help teachers develop supplementary language and word games for students, such as crossword puzzles. The terms are arranged alphabetically and space is provided at the end of each alphabetic section so that additional words and definitions can be added. Although the major focus of the glossary is energy resources, it also includes brief definitions of common concepts, principles, and expressions related to conservation. The glossary concludes with a form requesting that readers propose new words or suggest changes in existing content. (DB)

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THE ENERGY & CONSERVATION EDUCATION GLOSSARY

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SP-011528

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FOREWORD

ACKNOWLEDGMENT

This is the second edition of the EME GLOSSARY. The first edition was prepared by a committee of educators and industry advisors working under the editorial direction of Dr. John Jones and Dr. Ed Dalton. The initial edition had a dual focus—energy and environment. This edition expands the energy references and incorporates conservation as a second focus. The draft was prepared by Anita Jones, with final additions and editorial refinements made by Dr. John Jones, Dr. Ed Dalton, Sharon Scherner and Jon Thompson. Typing was provided by Fran Gundry and Barbara Zuetell.

PURPOSE

A glossary is, well, a glossary . . . unless you use it as a teaching tool. The ENERGY & CONSERVATION EDUCATION GLOSSARY is special because it focuses on the many energy and conservation terms which have recently assumed new importance for all of us. It will certainly help you identify the meaning of these words.

What else can this GLOSSARY do? Several possibilities come to mind. First, it is part of an interrelated set of energy and conservation education resources prepared for teachers by Energy & Man's Environment. The GLOSSARY will provide easy reference to the terms which appear in the related materials. In addition, innovated teachers know that energy and conservation concernsa re of considerable interest to nearly evervone, especially students. As such, the GLOSSARY provides a useful resource for teaching basic skills. Hiding in this innocent volume is a wide variety of organizing, classifying, and related learning opportunities. Add interest to your instruction by using the ENERGY & CONSERVATION EDUCATION GLOSSARY to create word search games, crossword puzzles, and other language and word power experiences.

USING THE ENERGY & CONSERVATION EDUCATION GLOSSARY

The GLOSSARY terms are arranged alphabetically. In addition, space has been provided at the end of each alphabetic section so that you can add words and definitions. If you would like to propose new words, or suggest changes in existing content, please use the forms provided for that purpose at the end of the GLOSSARY.

OTHER ENERGY & CONSERVATION EDUCATION RESOURCES FROM ENERGY & MAN'S ENVIRONMENT

THE ENERGY & CONSERVATION EDUCATION GLOSSARY is designed as one of interrelated set of reference and teaching resources. These include:

- THE ENERGY EDUCATION BIBLIOGRAPHY
- THE ENERGY FILMS INDEX
- THE ACTIVITY GUIDES
- LESSON PLAN NOTEBOOKS
- THE ENERGY CONSERVATIONS CORPS—A 4-6 grade project which incorporates teacher-directed classroom conservation instruction and a student-centered community service activity.
- Other EME supplementary materials include the annual CLASSROOM ENERGY CALENDAR, CONSERVATION EYE CHART, and the ENERGIST, a teacher's newsletter and resource guide.

All EME materials can be obtained by writing to the following address:

Energy & Man's Environment
Publications Department
0224 S.W. Hamilton, Suite 301
Portland, OR 97201

ENERGY & MAN'S ENVIRONMENT

Energy & Man's Environment is a nonprofit educational corporation. Its purpose is to help educators understand the nature and extent of the energy dilemma and its educational implications. To accomplish this purpose, EME develops and supports balanced and objective programs designed to achieve energy literacy.

energy ('en-r-jē) that which does work, or is capable of doing work

At one time or another, nearly all students memorize this or a similar definition for energy. To most, the definition has little meaning. It does not explain what energy **is.** It reveals very little of the nature of energy or the essence of the complex concept.

There is no one definition which can adequately describe energy, any more than there is one definition which adequately describes "truth". This is largely due to the fact that energy is not tangible; it is not an object. It is, rather, a term describing an elusive force which reveals itself in a variety of forms. As a concept, it describes how and why activity occurs or conditions exist. Without energy, nothing would ever happen! All processes would halt. Energy is, in an absolute sense, the universal "glue" that binds into order the elements of the living and nonliving world.

Understanding the concept of energy requires much more than memorization of a definition from a dictionary or glossary. Understanding requires a perception of energy forms—(electrical, thermal, chemical, gravitational, nuclear, light). Understanding requires knowledge of the sources of these forms of energy; their conversions, applications, limitations, impacts and management. When these are internalized, we can say that an individual is energy literate.

When we speak of an "energy crisis" we acknowledge the fact that many presently used sources of energy are rapidly disappearing and cannot be replenished. Finding new sources of usable energy takes time. We are running out of time. We must conserve our energy resources by reducing waste and managing our rate of use. Unless we do this now, there may not be a desirable future for us, for our children, or for the generations to come. As educators, we can neither safely ignore nor escape our responsibility for the future.

a

ABATEMENT: The act of reducing the degree or intensity of any condition, such as pollution.

ABSORPTION: The penetration of a substance into or through another.

ACCELERATOR: In radiology, a device for imparting high velocity to charged particles such as electrons or protons. These fast particles can penetrate matter and are known as radiation.

ACCLIMATION: The physiological and behavioral adjustments of an organism to changes in its immediate environment.

ACCLIMITIZATION: The acclimation or adaption of a particular species over several generations to a marked change in the environment.

ACRE-FOOT: A volume of water one foot in depth covering an area of one acre.

ACTIVATED CARBON: A highly adsorbent form of carbon, used to remove odors and toxic substances from gaseous emissions. In advanced waste treatment, activated carbon is used to remove dissolved organic matter from waste water.

ACTIVATION: The process of making a material radioactive by bombardment with neutrons, protons, or other nuclear particles or photons.

ADAPTATION: A change in structure or habit of an organism that produces better adjustment to the environment.

ADSORPTION: The adhesion of a substance to the surface of a solid or liquid. Adsorption is often used to extract pollutants by causing them to be attached to such adsorbents as activated carbon or silica gel. Hydrophobic, or water-repulsing adsorbents, are used to extract oil from waterways in oil spills.

AEROBIC: Living, active, or occurring only in the presence of oxygen.

AFTERBURNER: An air pollution abatement device that incinerates products of combustion and removes undesirable organic gases through incineration.

AFTERCOOLING: The cooling of a reactor after it has been shut down.

AFTERHEAT: The heat produced by the continuing decay of radioactive atoms in a reactor after fission has stopped. Most of the afterheat is due to the radioactive decay.

AIR CHANGES: Replacement of air in a room over a period of time. Often in cubic feet per minute (CFM).

AIR CURTAIN: A method for mechanical containment of oil spills. Air is bubbled through a perforated pipe causing an upward water flow that retards the spreading of oil. Air curtains are also used as barriers to prevent fish from entering a polluted body of water.

AIR POLLUTION: The presence of contaminants in the air in concentrations that rpevent the normal ability of the air to clean itself and that interfere directly or indirectly with man's health, safety or comfort or with the ful use and enjoyment of his property.

AIR POLLUTION EPISODE: The presence of abnormally high concentrations of air pollutants usually occurring during periods of low winds and temperature inversion, which may result in illness and death. See **INVERSION.**

AIR SAMPLING: The collection and analysis of samples of air to measure its radioactivity or to detect the presence of radioactive substances, particulate matter or chemical pollutants.

ALPHA PARTICLE: A positively charged particle emitted by certain radioactive materials. It is the least penetrating of the three common types of radiation (alpha, beta, and gamma) and usually not dangerous to plants, animals or man.

ALTERNATING CURRENT: An electric current that reverses its direction of flow at regular intervals and has alternately positive and negative values, the sum of which over a period of time is zero.

AMBIENT AIR: Existing air.

AMMETER: An instrument for measuring the strength of an electric current.

AMPERE: A unit of measure of current.

ANAEROBIC: Refers to life or processes that occur in the absence of oxygen.

ANIMAL WASTE CONVERSION: The process of obtaining oil from animal wastes.

APPLIANCE SATURATION: Ratio of the number of homes using a specific appliance to the total number of homes.

AQUIFER: An underground bed or stratum of earth, gravel or porous stone that contains water.

AREA SOURCE: In air pollution, any small individual fuel combustion source, including any transportation sources. Area Source is legally and precisely defined in Federal regulations. See **POINT SOURCE.**

ASPHALT: A brown to black solid or semisolid bituminous substance manufactured or occuring in nature.

ASSIMILATION: Conversion or incorporation of absorbed nutrients into protoplasm. Also refers to the ability of a body of water to purify itself of organic pollution.

ATMOSPHERE: The air. The layer of gases surrounding the earth.

ATOM: The smallest part of any element that has the characteristics of that element. The smallest particle of an element which can enter into a chemical combination. All chemical compounds being caused by the nature, number, and arrangement of their component atoms.

ATOMIC ENERGY: The constitutive internal energy of the atom which was absorbed when it was formed. Energy derived that can be released by changes in the nucleus of the atom.

ATOMIC PILE: A nuclear reactor.

ATTRITION: The act of rubbing together, friction. The act of wearing or grinding down by friction.

Write additional "A" words here:

b

BACKGROUND LEVEL: Amount of pollutants present in the ambient air due to natural sources.

BACKGROUND RADIATION: Normal radiation present in the lower atmosphere from cosmic rays and from earth sources.

BACKSCATTER: When radiation of any kind strikes matter (gas, solid or liquid), some of it may be reflected or scattered back in the general direction of the source.

BAFFLE: Any air deflector device used to change the direction of flow or the velocity of water, sewage or products of combustion such as fly ash or coarse particulate matter. Also used in deadening sound.

BAGHOUSE: An air pollution abatement device used to trap particulates by filtering gas streams through large fabric bags, usually made of glass fibers.

BALING: A means of reducing the volume of solid waste by making it more compact.

BARREL: A liquid volume measure equal to 42 U.S. gallons (159 liters). Although seldom stored in actual "barrels," crude oil is measured in a unit called the barrel. One barrel of crude oil has the same energy as 350 pounds of coal.

BASE: A selected time unit with consumption level or dollar amounts to which all future usage or costs are compared.

BASE LOAD: 1. The average electrical demand in a stated period of time. 2. The minimum electrical demand in a stated period of time.

BATT: See **BLANKET INSULATION.**

BEDROCK: The part of the earth's crust that is almost unbroken rock.

BETA PARTICLE: An elementary negatively charged particle emitted by radioactive decay. It is easily stopped by a thin sheet of metal.

BIOASSAY: The employment of living organisms to determine the biological effect of some substance, factor or condition.

BIOCHEMICAL OXYGEN DEMAND (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. Large amounts of organic waste use up large amounts of dissolved oxygen, thus the greater the degree of pollution, the greater the BOD.

BIOCONVERSION: A general term describing the conversion of one form of energy into another by plants or microorganisms. Example: digestion of solid wastes or sewage sludge by microorganisms to form methane.

BIODEGRADABLE: Having the potential of being broken down into small molecules by the action of living microorganisms including bacteria and fungi.

BIOLOGICAL DOSE: The radiation dose absorbed in biological material. Measured in rems.

BIOLOGICAL SHIELD: A mass of absorbing material placed around a reactor or radioactive source to reduce the radiation to a level safe for humans.

BIOMONITORING: The use of living organisms to test the suitability of effluent for discharge into receiving waters downstream from a discharge.

BIOSPHERE: The portion of the earth and its atmosphere capable of supporting life.

BIOTA: All the species of plants and animals occurring within a certain area.

BIOTIC COMMUNITY: A group of plants, animals, and microbes living together and depending on each other for food, shelter, etc.

BITUMINOUS COAL: "Soft coal," containing between 15 and 50 percent of volatile matter.

BITUMINOUS ROCK: A rock containing hydrocarbons or bituminous material.

BLACKOUT: A total power failure caused unintentionally by storm damage, equipment failure, or overloading utility equipment.
An exceptional situation in which all power is deliberately cut off by electrical generating facilities.

BLANKET INSULATION: Cotton fiber, mineral wood, or wood fiber made into varying thicknesses in a length.

BLOWDOWN: Water drawn from boiler systems and cold water basins of cooling towers to prevent buildup of solids concentrations. Usually contains chemicals used for pH adjustment and slime control.

B.O.E.: Barrel of Oil Equivalent: a unit of energy equivalent to the energy in a barrel of crude oil or 5,800,000 BTU's.

BOILER EFFICIENCY: The ability of a unit to convert a form of energy (gas, oil, or coal) to heat energy at the highest possible rate; i.e.: 80-85 percent efficiency should be an attainable goal.

BOILING: The process that changes liquid to gas in which bubbles of gas form below the surface of the liquid. Rapid vaporization which disturbs a liquid and which occurs when the vapor pressure of the liquid equals the pressure on its surface.

BOILING POINT: The temperature at which a liquid boils. The temperature at which the vapor pressure of a liquid equals the pressure of the atmosphere. If the pressure of the liquid varies, the actual boiling point varies.

BOILING WATER REACTOR: A reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam can be used directly to drive a turbine.

BOOM: A floating device that is used to contain oil and other floating matter on a body of water.

BREEDER: A nuclear reactor that produces more fuel than it consumes.

BREEDER REACTOR: A nuclear reactor that creates more fissionable fuel than it consumes. A nuclear chain reaction in which conversion produces a greater number of fissionable atoms than the number of parent atoms consumed.

BREEDING RATIO: The ratio of the number of fissionable atoms produced in a breeder reactor to the number of fissionable atoms consumed in the reactor.

BROWNOUT: The deliberate lowering of voltage (and thus the power supplied to all users) by electric utility companies when demand for power exceeds generating capacity.

BTU (BRITISH THERMAL UNIT): The standard unit for measurement of the amount of heat energy, such as the heat content of fuel. Equal to the amount of heat energy necessary to raise the temperature of one pound of water one degree Fahrenheit. (3.968 BTU's per kilocalorie — 100 calories.) The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at, or near, its point of maximum density (39.1F).

BUILDING ORIENTATION: The arrangement of a building in relation to sun exposure, prevailing winds, etc.; affects heat loss and gain in building.

Write additional "B" words here:

CALORIE: Unit of quantity of heat. The amount of heat required to raise the temperature of 1 kilogram of water 1 degree Centigrade. The National Bureau of Standards defines the calorie as 4.18400 joules. (1 BTU is equivalent to 1055 joules.)

CAPABILITY: The maximum load which a generator, turbine, power plant, transmission circuit, or power system can supply under specified conditions for a given time interval without exceeding approved limits of temperature and stress.

CAPACITY: The load for which a generator, transmission circuit, power plant, or system is rated. Capacity is also used synonymously with capability.

CARBON DIOXIDE (CO_2): A colorless, odorless, toxic gas that is a normal part of the ambient air. CO_2 is a product of fossil fuel combustion.

CARBON MONOXIDE (CO): A colorless, odorless, highly toxic gas that is a normal byproduct of incomplete fossil fuel combustion. CO, one of the major air pollutants, can be harmful in small amounts if breathed over a certain period of time.

CARNIVORE: Meat-eating.

CASK: A container used for the safe transportation of radioactive materials.

CATALYTIC CONVERTER: An air pollution abatement device that removes organic contaminants by oxidizing them. Can be used to reduce nitrogen oxide emissions from motor vehicles.

CAULKING: The filling of cracks with a solid material such as plastic.

CCF: A hundred cubic feet. Used as a measure by natural gas companies for billing purposes.

CELSIUS: A metric temperature scale on which the freezing point of water is 0 degrees and the boiling point of water is 100 degrees. The temperature scale using the ice point as 0 and the steam point as 100, with 100 equal divisions or degrees between; also known as the Centigrade Scale.

CENTRIFUGAL COLLECTOR: Any of several mechanical systems using centrifugal force to remove particles from a gas stream.

CFM: Cubic feet per minute. Usually refers to air change.

CFS: Cubic feet per second.

CHAIN REACTION: A reaction that stimulates its own repetition. In a fission chain reaction, a fissionable nucleus absorbs a neutron and fissions, releasing additional neutrons. These in turn can be absorbed by other fissionable nuclei, releasing still more neutrons. A fission chain reaction is self-sustaining when the number of neutrons released in a given time equals or exceeds the number of neutrons lost in absorption or by escape from the system.

CHEMICAL ENERGY: The kind of energy that may be released when a chemical reaction takes place.

CHEMICAL REACTION: A chemical change.

CHEMICAL SHIM: Chemicals, such as boric acid, which are placed in a reactor coolant to control the reactor by absorbing neutrons.

CHILLING EFFECT: The lowering of the earth's temperature due to the increase of atmospheric particulates that inhibit penetration of the sun's energy.

CHLOROPHYLL: The chemical substance that gives green plants their color and helps them carry on photosynthesis.

CIRCUIT: The complete path transversed by an electric current.

CIRCUIT BREAKER: An automatic switch which breaks the circuit when too much electricity is flowing. It is similar to a fuse, but it can be reused.

CLADDING: The outer jacket of nuclear fuel elements. It prevents corrosion of the fuel by the coolant and the release of fission products into the coolant. Aluminum or its alloys, stainless steel and zirconium alloys are common cladding materials.

CLOCK-ACTUATED THERMOSTAT: Automatically changes the thermostat between two settings at predetermined times, permitting the temperature to be automatically reduced in the evening.

COAL: A solid, combustible, organic hydrocarbon formed by the decomposition of vegetable material without free access to air.

COAL GAS: An artificial gaseous fuel produced by heating coal in the absence of oxygen. This fuel, known as manufactured gas, can supply about 450 BTU per standard cubic foot. Use of coal gas in the U.S. ceased when inexpensive natural gas became widely available. Usually toxic if inhaled.

COAL GASIFICATION: The conversion of coal to a gas suitable for use as a fuel.

COMBUSTION: Burning. Technically, a rapid oxidation accompanied by the release of energy in the form of heat and light. It is one of the three basic contributing factors causing air pollution. The others are attrition and vaporization.

COMFORT AIR CONDITIONING: The process of treating air so as to control simultaneously its temperature, humidity, cleanliness, and distribution.

COMFORT ZONE: The proper combination of temperature, humidity, and air movement to create a feeling of comfort.

COMMINUTION: Mechanical shredding or pulverizing of waste, a process that converts it into a more uniform manageable material.

COMPACTION: Reduction of bulk or solid waste by rolling or tamping.

COMPOST: Relatively stable decomposed organic material.

COMPOSTING: A controlled process of degrading organic matter by microorganisms. (1) mechanical — a method in which the compost is continuously and mechanically mixed and aerated. (2) ventilated cell — compost is mixed and aerated by being dropped through a vertical series of ventilated cells. (3) window — an open air method in which compostable material is placed in windows, piles or ventilated bins or pits and occasionally turned or mixed. The process may be anaerobic or aerobic.

COMPOUNDS: Substances containing more than one constituent element and having properties, on the whole, different from those which their constituents had as elementary substances. The composition of a given pure compound is perfectly definite, and is always the same no matter how that compound may have been formed.

CONDENSATE: Known sometimes as distillate. A heavier liquid hydrocarbon occurring usually in gas reservoirs of great depth and high pressure.

CONDENSATION: The change from gas to liquid.

CONDENSER: In a nuclear reactor, a mechanism for converting steam back to water by extracting heat so that the water can be returned to the reactor vessel.

CONDENSER COOLING WATER: Water required to condense steam after its discharge from a steam turbine.

CONDUCTION, THERMAL: The transmission of heat through a substance from places of higher to places of lower temperature.

CONDUCTOR (ELECTRICAL): A material capable of carrying an electrical current.

CONSERVATION: The international care or preservation of resources.

CONSERVATION OF MATTER AND ENERGY: (Law of) Matter and energy are interchangeable; the total amount of energy and matter in the universe remains constant.

CONSERVATION OF MECHANICAL ENERGY: (Law of) The sum of the potential and kinetic energy of an ideal energy system remains constant.

CONSERVE: To manage or use wisely.

CONTAINMENT VESSEL: A gas tight shell or other enclosure around a nuclear reactor.

CONTRACT DEMAND: The demand that the supplier of electric service agrees to have available for delivery.

CONTROL ROD: A rod, plate, or tube containing a material that readily absorbs neutrons (hafnium, boron, etc.), used to control the power of a nuclear reactor. By absorbing neutrons, a control prevents the neutrons from causing further fission.

CONVECTION: The movement of heat through a liquid or gas in currents of the substance. The transfer of energy by moving masses of matter, such as the circulation of a liquid or gas.

CONVENTIONAL HYDROELECTRIC PLANT: A hydroelectric power plant utilizes steam flow only once as the water passes downstream, as opposed to a pumped-storage plant which recirculates all or a portion of the steamflow in the production of power.

CONVERSION RATIO: The ratio of the number of atoms of new fissionable material produced in a converter reactor to the original number of atoms of fissionable fuel consumed.

COOLANT: A substance circulated through a nuclear reactor to remove or transfer heat. Common coolants are water, heavy water, air, carbon dioxide, liquid sodium and sodium-potassium alloy.

COOLING TOWER: A device used to cool power plant condenser water before it is returned to lake, river, or ocean. The cooling tower is intended to prevent thermal pollution.

COOLING WATER CONSUMPTION: The cooling water withdrawn from the source supplying a generating plant which is lost to the atmosphere. Caused primarily by evaporative cooling of the heated water coming from the condenser. The amount of consumption (loss) is dependent on the type of cooling employed — direct (once-through) cooling pond, or cooling tower. When not returned to the source of supply, blowdown is also included as a consumptive loss.

COOLING WATER LOAD: Waste heat energy dissipated in the cooling water.

COOLING WATER REQUIREMENT: The amount of water needed to pass through the condensing unit is dependent on the type of cooling employed and water temperature.

COOPERATIVES (COOPERATIVELY OWNED ELECTRIC UTILITIES): A group of persons who have organized a joint venture for the purpose of supplying electric energy to a specified area and owned by its members. Such ventures are generally exempt from the Federal Income Tax laws. Most cooperatives have been financed by the Rural Electrification Administration.

CORE: The center of a nuclear reactor where fuel assemblies are located.

COSMIC RAYS: Radiation of many sorts but mostly atomic nuclei (protons) with very high energies, originating outside the earth's atmosphere. Cosmic radiation is part of the natural background radiation. Some cosmic rays are more energetic than any man-made forms of radiation.

COULOMB: The quantity of electricity equal to the charge of 6.25×10^{18} electrons.

CRITICAL HYDRO PERIOD: Period when the limitations of hydroelectric power supply due to water conditions are most critical with respect to system load requirements.

CRITICAL MASS: The mass of fissionable material that will support a self-sustaining chain reaction.

CRUDE OIL: Petroleum liquids as they come from the ground. Petroleum liquids were formed from animal and vegetable material which collected at the bottom of ancient seas.

CRUST: The solid, cool exterior of the earth.

CUBIC FOOT: The volume of a cube, the edges of which are one foot in length. The most common unit of measurement of gas volume.

CURIE: A measure of radioactivity. Any quantity of radioactive material in which 37 billion atoms are disintegrated every second is said to have an activity of 1 curie.

CURRENT (ELECTRIC): The rate of transfer of electricity. (Ampere is unit of measure.)

CURTAILMENT: Cutting back the use of energy resources as opposed to conserving or wisely using energy resources.

CYCLE: A set of changes through which certain materials go, which leads back to an original form.

CYCLONE COLLECTOR: A device used to collect large size particulates from polluted air by centrifugal force.

Write additional "C" words here:

d

DECAY: The action of bacteria and fungi that use organic matter as food and break it down into smaller molecules.

DECAY (RADIOACTIVE): The spontaneous transformation of one nuclide into a different nuclide or into a different energy state of the same nuclide. The process results in a decrease, with time, of the number of the original radioactive atoms in a sample.

DECIBEL (db): A unit used for measuring the intensity of sounds.

DECIDUOUS: Trees and shrubbery that lose their leaves during the fall season of each year and regain them in the spring.

DECOMPOSITION: Reduction of the net energy level, structure, and change in chemical composition of organic matter because of the actions of aerobic or anaerobic microorganisms. The physical bodies and/or wastes of animals, plants, and humans are capable of decomposition.

DEGREE DAY: A term used to denote the coldness of the weather for purposes of calculating heating system requirements. DD = 65 degrees F-$\frac{\text{maximum-minimum}}{2}$.

DEGREE DAYS, COOLING: A measure of temperature as it affects energy demand for space cooling. Generally, the number of degrees above 65° F provided by averaging a day's high and low temperatures.

DEGREE DAYS, HEATING: A measure of temperature as it affects energy demand for space heating. The number of degrees below 65° F provided by the average of a day's high and low temperatures. The larger the degree day number, the colder the weather.

DEMAND: The requirement for electric energy to be delivered by a system at a given instant averaged over any designated period of time, expressed in kilowatts or other suitable units.

DENSITY: Concentration of matter, measured by the mass per volume.

DESALINIZATION: Salt removal from sea or brackish water.

DESIGN TEMPERATURE: The difference between the desired indoor temperature and the outdoor temperature for a given locality.

DEUTERIUM: A form of hydrogen atom in which the nucleus contains one proton and one neutron. About .015% of all hydrogen atoms have such nuclei. Deuterium is expected to be the primary fuel for fusion power plants.

DIESEL OIL: Fuel used for internal combustion in diesel engines and space heating; usually that fraction which distills after kerosene.

DIRECT CURRENT: An electric current that flows in only one direction through a circuit, as from a battery.

DIRECT ENERGY CONVERSION: The process of changing any form of energy into electricity without machinery that has moving parts. For example, a battery changes chemical energy into electricity by direct energy conversion.

DISPERSANT: A chemical agent used to break up concentrations of organic material. In cleaning oil spills, dispersants are used to remove oil from that water surface.

DISSOLVED OXYGEN (DO): The oxygen dissolved in water or sewage. Adequately dissolved oxygen is necessary for the life of fish and other aquatic organisms and for the prevention of offensive odors. Low dissolved oxygen concentrations generally are due to discharge of excessive organic solids having high BOD, the result of inadequate waste treatment.

DISSOLVED SOLIDS: The total amount of dissolved material, organic and inorganic, contained in water or wastes. Excessive dissolved solids make water unpalatable for drinking and unsuitable for industrial uses, including cooling towers.

DISTILLATION: The removal of impurities from liquids by boiling. Steam condensed back into liquid is almost pure water; the pollutants remain in the concentrated residue.

DISTRIBUTION: The act or process of distributing electric energy from convenient points on the transmission or bulk power system to the consumers.

DOSE: In radiology, the quantity of energy or radiation absorbed.

DOSIMETER/DOSEMETER: An instrument used to measure the amount of radiation a person has received.

DOUBLE GLAZED WINDOW: Two panes of glass factory-sealed together with a small air space between them. Double glazing has about twice the R-value of single glazing.

DRAWDOWN: The distance that the water surface of a reservoir is lowered from a given elevation as the result of the withdrawal of water. Drawdown may refer to the maximum drawdown for power operation, from normal full pool to minimum power pool. Sometimes drawdown is also expressed in terms of acre-feet of storage withdrawn.

DRY LIMESTONE PROCESS: A method of controlling air pollution caused by sulfur oxides. The polluted gases are exposed to limestone which combines with oxides of sulfur to form manageable residues.

DUMP: A land site where solid waste is disposed; or energy generated by water power that cannot be stored or conserved when such energy is beyond the immediate needs of the producing system.

DUMP (ELECTRIC POWER): Electricity available from water that would otherwise go to the sea.

Write additional "D" words here:

e

ECO's: Energy conserving opportunities/measures.

ECOLOGICAL IMPACT: The total effect of an environmental change, either natural or man-made, on the ecology of the area.

ECOLOGY: The interrelationships of living things to one another and to their environment or the study of such interrelationships.

ECOSPHERE: See **BIOSPHERE.**

ECOSYSTEM: The interacting system of a biological community and its nonliving environment.

EER (ENERGY EFFICIENCY RATIO): An indication of how efficiently an appliance uses energy.

EFFICIENCY: That percentage of the total energy content of a power plant's fuel which is converted into electricity. The remaining energy is lost to the environment as heat. Always less than 100% of original energy available.

EFFLUENT: A discharge.

ELECTRIC FIELD: The region in which a force acts on an electric charge brought into the region.

ELECTRICAL ENERGY: The energy associated with electric charges and their movements. Measured in watt hours or kilowatt hours. One watt-hour equals 860 calories.

ELECTROCHEMICAL CELL: A cell in which chemical energy is converted to electric energy by a spontaneous oxidation-reduction reaction.

ELECTRODE: A conducting element in an electric cell, electronic tube, or semiconductor device.

ELECTRODIALYSIS: A process that uses electrical current and an arrangement of permeable membranes to separate soluble minerals from water. Often used to desalinize salt or brackish water.

ELECTROLYTE: A substance with a solution capable of conducting an electric current.

ELECTROMAGNETIC WAVES: Transverse waves having an electric component and a magnetic component, each being perpendicular to the other and both perpendicular to the direction of transmission.

ELECTRON: The electron is a small particle having a unit of negative electrical charge, a small mass, and a small diameter. Every atom consists of one nucleus and one or more electrons. One of the negatively charged particles that forms part of every atom.

ELECTRON VOLT (eV): A unit of energy equal to the kinetic energy gained by an electron as it moves through a potential difference of 1 volt.

ELECTRO-PROCESS INDUSTRY: An industry which requires very large amounts of electricity in manufacturing for heat or chemical processes (as distinguished from wheel turning or mechanical applications). Examples are electric furnace steel, aluminum, chlorine, and plating.

ELECTROSTATIC PRECIPITATOR: An air pollution control device that removes particulate matter by imparting an electrical charge to particles in a gas stream for mechanical collection on an electrode of an opposing electrical charge.

EMISSION: See **EFFLUENT.** (Generally used in regard to discharges into air.)

EMISSION FACTOR: The average amount of a pollutant emitted from each type of polluting source in relation to a specific amount of material processed. For example, an emission factor for a blast furnace (used to make iron) would be a number of pounds of particulates per ton of raw materials.

EMISSION INVENTORY: A list of air pollutants emitted into a community's atmosphere, in amounts (usually tons) per day, by type of source. The emission inventory is basic to the establishment of emission standards.

EMISSION STANDARD: The maximum amount of a pollutant legally permitted to be discharged from a single source.

ENERGY AUDIT: Examination of a building, original drawing, energy history and usage patterns to identify energy conserving opportunities. Mini-audits and maxi-audits indicate the relative thoroughness of the study.

ENERGY CONTENT CURVE: A seasonal guide to the use of reservoir storage for at-site and downstream power generation. It is based on the following constraints: (1) During drawdown sufficient storage shall remain in the reservoir to insure meeting its share of the system firm energy requirements in the event of critical period water

conditions. (2) Draft of storage for secondary energy production is permitted only to the extent that it will not jeopardize reservoir refill by the end of the coming July. Drafting below the assured refill level is permitted only if required to meet firm energy loads or if such draft is secured by a commitment to return energy equivalent to the drafted water if refill is not otherwise accomplished.

ENERGY COST SAVINGS: Energy savings x $/energy unit (therm, mcf, KW-HR). Note: This is not a "saving" in the purest sense. It is cost avoidance based on anticipated reduction in energy consumption.

ENERGY MIX: The applied variable combinations of all energy sources in a locale or region, (e.g.: electrical energy might be supplied by a mix of hydroelectric, nuclear and fossil fuels).

ENRICHED URANIUM: Uranium in which the amount of the fissionable isotope, uranium-235, has been increased above the 0.7 percent contained in natural uranium.

ENRICHMENT: The addition of nitrogen, phosphorus and carbon compounds or other nutrients into a lake or other waterway that greatly increases the growth potential for algae and other aquatic plants. Most frequently, enrichment results from the inflow of sewage effluent or from agricultural runoff.

ENTROPY: A trend toward disorder; a wearing away or running down. In temperature, the flow from hot to cold. In every energy conversion process, an inevitable heat loss occurs, and certain amounts of the energy become useless. This is known as waste heat.

ENVELOPE: Or building envelope, is the exterior structure and excludes interior walls or mechanical considerations.

ENVIRONMENT: The sum of all external conditions and influences affecting the life, development and, ultimately, the survival of an organism. Everything that affects a living organism.

ENVIRONMENTAL IMPACT STATEMENT: A document describing the environmental impact of actions that may affect the quality of the human environment. Environmental impact statements are used as tools for decision-making.

EPA: Environmental Protection Agency.

EROSION: The wearing away of the land surface by wind or water. Erosion occurs naturally from weather or runoff but is often intensified by man's land-clearing practices.

ESTUARIES: Areas where the fresh water meets salt water. For example, bays, mouths of rivers, salt marshes and lagoons. Estuaries are delicate ecosystems; they serve as nurseries, spawning and feeding grounds for a large group of marine life and provide shelter and food for birds and wildlife.

EVAPORATION: The change from liquid to gas in which molecules escape from the surface of the liquid. Like boiling water.

EXCLUSION AREA: An area of 1/2 mile immediately surrounding a nuclear reactor where human habitation is prohibited to assure safety in the event of an accident.

EXPONENTIAL GROWTH: A quantity exhibits exponential growth when it is increased by a constant percentage of the whole during a constant time period. A colony of bacteria in which each bacterium divides into 2 bacteria every 10 minutes grows exponentially.

Write additional "E" words here:

f

FABRIC FILTER: A device for removing dust and particulate matter from industrial emissions much like a home vacuum cleaner bag. The most common use of fabric filters is baghouse.

FAHRENHEIT: The temperature scale on which the freezing point of water is 32 degrees and the boiling point of water is 212 degrees.

FAHRENHEIT DEGREE: 1/180 of the difference between the temperature of melting ice and that of water boiling under standard (760 mm.) atmospheric pressure.

FAST BREEDER REACTOR: A fission reactor in which the neutrons are traveling at high velocities. The principal nuclear reaction envisioned for most proposed fast breeders is conversion of nonfissionable U-238 to fissionable plutonium-239.

FEEDSTOCK: Energy resources used as raw materials in the production of such products as wax and asphalt rather than as fuels for burning.

FENESTRATION: Arrangement or proportion of windows in a building.

FILLING: The process of depositing dirt and mud in marshy areas to create more land for real estate development. Filling can disturb natural ecological cycles.

FILM BADGE: A piece of masked photographic film worn as a badge by nuclear workers to monitor exposure to radiation. Nuclear radiation darkens the film.

FILTRATION: In waste water treatment, the mechanical process that removes particulate matter by separating water from solid material, usually by passing it through sand.

FIRM ENERGY: Electric energy which is considered to have assured availability to the customer to meet all or any agreed upon portion of his load requirements. Firm energy is based on certain specified probability considerations which, in the Pacific Northwest, are related to the 1928-58 sequence of historical streamflows adopted for making system power regulations. System firm energy capability includes hydro system prime energy, thermal plant energy capabilities, and firm imports.

FIRM LOAD: That part of the system load which must be met with firm power.

FIRST COST: Original construction cost; does not consider recurring management and operations cost.

FIRST LAW OF THERMODYNAMICS: Also called the Law of Conservation of Energy: Energy can be neither created nor destroyed.

FISSION: A nuclear reaction from which the atoms produced are each approximately half the mass of the parent nucleus. In other words, the atom is split into two approximately equal masses. There is also the emission of extremely great quantities of energy since the sum of the masses of the two new atoms is less than the mass of the parent heavy. The splitting of an atomic nucleus by a subatomic particle (free neutron), releasing energy.

FLUE GAS: A mixture of gases resulting from combustion and emerging from a chimney. Flue gas includes nitrogen oxides, carbon oxides, water vapor and often sulfur oxides or particulates.

FLUE GAS ANALYSIS: A test procedure whereby a relationship of air, fuel and stack temperature indicates the apparent transfer of energy during combustion of the fuel to the energy wasted through the stack to the atmosphere.

FLYWHEEL: A method of energy storage working on the principle of a spinning wheel. By its inertia, a spinning wheel stores mechanical energy.

FOAM INSULATION: (1) styrofoam, (2) rigid foam boards, or (3) liquid foam insulation.

FOOD CHAIN: A simple diagram showing how organisms feed on each other. In each link of the chain there is one organism. From the beginning of the food chain, the kinds of organisms are producer, herbivore, primary carnivore, and secondary carnivore, which may also be a top carnivore.

FOOD PYRAMID: A diagram that shows the feeding relationships in an area. The pyramid is made of several rectangles, one above another.

FOOD WASTE: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking and serving of foods; commonly called garbage.

FOOD WEB: A pattern formed by lines that are drawn from each organism in a locality to the organisms it feeds on.

FOOT CANDLE: The amount of light given off by a standard candle from a distance of 1 foot.

FORCE: That which changes the state of rest or motion in matter, measured by the rate of change in momentum. The force **F** required to produce an acceleration **a** in a mass **M** is given by **F = ma.**

FORBAY: The water behind a dam.

FOSSIL FUELS: Coal, oil, natural gas, and other fuels originating from geologic deposits of ancient plant and animal life and depending on oxidation for release of energy.

FREEZING POINT: The temperature at which a liquid changes into a solid.

FRICTIONAL FORCE: Force required to move one surface across another.

FUEL: A substance used to produce heat energy, chemical energy by combustion or nuclear energy by nuclear fission.

FUEL CELL: A device in which fuel and oxygen are combined to produce chemical energy that is converted directly into electricity.

FUEL CYCLE: The series of steps involved in supplying fuel for nuclear power reactors. It includes mining, refining, the original fabrication of fuel elements, their use in a reactor, chemical processing to recover the fissionable material remaining in the spent fuel, re-enrichment of the fuel material, and refabrication into new fuel elements.

FUEL ELEMENT: A rod, tube, plate or other mechanical shape or form into which nuclear fuel is fabricated for use in a reactor.

FUEL REPLACEMENT ENERGY: Electric energy generated at a hydroelectric plant as a substitute for energy which would otherwise have been generated by a thermal-electric plant.

FUEL REPROCESSING: The processing of reactor fuel to recover the unused fissionable material.

FUSE: A device which melts when too many electrons are flowing, thus breaking the circuit and acting as a warning device and preventing fire.

FUSION (ATOMIC): A nuclear reaction involving the combination of smaller atomic nuclei or particles into larger ones with the release of energy from mass transformation. This is also called a thermonuclear reaction by reason of the extremely high temperature required to initiate it.

Write additional "F" words here:

g

GALLON: A unit of volume. A U.S. gallon contains 231 cu. in., 0.133 cubic feet, or 3.785 liters. One U.S. gallons of water weighs 8.3 lbs.

GALVANOMETER: An instrument for detecting small direct currents of electricity.

GAMMA RAY: Waves of radiant nuclear energy. Of the three types of radiation, gamma rays carry the most energy and penetrating capability and are best stopped by dense materials such as lead. Nuclear X-Rays: Emitted from radioactive substances, they are quanta of electromagnetic wave energy similar to, but not much higher energy than, ordinary x-rays.

GARBAGE: See **FOOD WASTE.**

GARBAGE DUMP: An area of land where refuse from a community is discarded.

GAS: The phase in which both the form and volume of a given amount of matter may change while the temperature and pressure remain the same. A state of matter in which the molecules are practically unrestricted by cohesive forces. A gas has neither definite shape nor volume.

GAS-COOLED REACTOR (GCR): A type of nuclear power reactor in which gas, usually helium, flows through the reactor core, becomes heated, and then gives up its heat to produce steam in a separate vessel. The steam is then used to drive a turbine.

GAS TURBINE: An industrial jet engine complex where one or more engines drive electrical generators.

GASOLINE: Petrol. Mixture of hydrocarbons obtained from petroleum.

GEIGER COUNTER: An electrical device that detects the presence of radioactivity.

GENERATING STATION (GENERATING PLANT): A station at which are located prime movers, electric generators and auxiliary equipment for converting mechanical, chemical, and/or nuclear energy into electrical energy.

GENERATION: The act or process of producing electric energy from other forms of energy, also the amount of electric energy so produced.

GENERATOR: A device that converts mechanical energy into electrical energy.

GEOTHERMAL: As applied to power generation, the use of heat energy obtained through the medium of hot water or steam coming from beneath the earth's surface.

GEOTHERMAL ENERGY: The heat energy available in the earth's subsurface. Heat energy in the crust of the earth believed to have been produced by natural radioactivity. The thermal gradient of the earth's crust is such that the temperature in a deep well or mine increases by about 1°F for each 100 feet of depth.

GLAZING: Another term for glass used in windows.

GRAVITATION: The universal attraction existing between all material bodies.

GREEN BELTS: Certain areas restricted from being used for roads, buildings, and houses; they often serve as separating buffers between pollution sources and concentrations of population.

GREENHOUSE EFFECT: The heat effect of the atmosphere upon the earth. Light waves from the sun pass through the air and are absorbed by the earth. The earth then reradiates this energy as heat waves that are absorbed by the air, specifically by carbon dioxide. The air thus behaves like glass in a greenhouse, allowing the passage of light but not of heat. Thus, many scientists theorize that an increase in the atmospheric concentration of CO_2 can eventually cause an increase in the earth's surface temperature. A method of using solar radiation to warm underheated areas (window treatments are opened to allow the window to admit and trap the sun's heat).

GROSS NATIONAL PRODUCT (GNP): The total market value of the goods and services produced by the nation before the deduction of depreciation charges and other allowances for capital consumption; a widely used measure of economic activity. A measure of economic activity which is not the total market value of all goods and services produced in a country. Depreciation and other allowances for capital consumption are not deducted.

GROUND COVER: Grasses or other plants grown to keep soil from being blown or washed away.

GROUNDWATER: The supply of water under the earth's surface in an aquifer or soil that forms a natural reservoir.

Write additional "G" words here:

h

HABITAT: The sum total of environmental conditions of a specific place that is occupied by an organism, a population or a community.

HALF-LIFE: The time it takes certain materials, such as persistent pesticides or radioactive isotopes, to lose half their strength. For example, the half-life of DDT is 15 years; the half-life of radium is 1,580 years.

HAMMERMILL: A broad category of highspeed equipment that uses pivoted or fixed hammers or cutters to crush, grind, chip or shred solid wastes.

HEAT: Energy possessed by a substance in the form of kinetic energy, usually measured in calories; in space heating by the British Thermal Unit. Heat is transmitted by conduction, convection or radiation.

HEAT CAPACITY: That quantity of heat required to increase the temperature of a system or substance one degree of temperature. It is usually expressed in calories per degree Celsius.

HEAT ENERGY: Energy that causes an increase in the temperature of an object. It may change the object from solid to liquid or from liquid to gas.

HEAT EXCHANGER: Any device that transfers heat from one fluid (liquid or gas) to another or to the environment.

HEAT GAIN: The amount of heat expressed in BTU's that enters an enclosed living space from outside the space or is produced by people and devices (such as a kitchen range) within the living space.

HEAT ISLAND EFFECT: An air circulation problem peculiar to cities. Tall buildings, heat from pavements and concentrations of pollutants create a haze dome that prevents rising hot air from being cooled at its normal rate. A self-contained circulation system is put in motion that can be broken by relatively strong winds. If such winds are absent, the heat island can trap high concentrations of pollutants and present a serious health problem.

HEAT LOSS: The amount of heat expressed in BTU's that escapes from an enclosed heated living space.

HEAT PUMP: A machine for extracting heat from a fluid which is at a slightly higher temperature than its surroundings. A device which transfers heat from a colder to a hotter reservoir by the expenditure of mechanical energy when the primary purpose is heating the hot reservoir rather than refrigeration apparatus. Heat pumps are more efficient for residential heating than electrical resistive heating. A device that absorbs heat from the outside air and pumps it into the house. It works in reverse as a standard air conditioner for cooling.

HEAT RATE: A measure of a thermal generating station's efficiency, generally expressed at BTU per (net) kilowatt-hour. It is computed by dividing the total BTU content of the fuel burned (or of heat released from the nuclear reactor) by the resulting net kilowatt-hours generated.

HEAT SINK: Anything that absorbs heat; usually part of the environment, such as the air, a river, or outer space.

HEATING SEASON: The coldest months of the year.

HEAVY WATER MODERATED REACTOR: A reactor that uses heavy water as its moderator. Heavy water is an excellent moderator and thus permits the use of inexpensive (unenriched) uranium as a fuel.

HERBIVORE: An organism or animal that feeds on vegetation.

HIGH SULFUR COAL: Generally, coal that contains more than one percent of sulfur by weight.

HIGH TENSION: High voltage.

HI-VOLUME SAMPLER: A device used in the measurement and analysis of suspended particulate pollution. Also called a Hi-Vol.

HORSE POWER: British unit of power. 1 HP = 746 watts, or 42.408 BTU's per minute. A unit that measures the rate at which energy is produced or used. A man doing heavy manual labor produces energy at that rate of about .08 horsepower.

HOT: A colloquial term meaning highly radioactive, or containing an electrical charge.

HUMUS: Decomposed organic material in the soil.

HVAC (or hvac): Heating, ventilating, and air conditioning systems.

HYDRO-: Prefix denoting water.

HYDROCARBONS: A vast family of compounds containing carbon and hydrogen in various combinations, found especially in fossil fuels. Some hydrocarbons are major air pollutants, some may be carcinogenic and others contribute to photochemical smog.

HYDROELECTRIC PLANT: An electric power plant in which the turbine generators are driven by falling water.

HYDROELECTRICITY: Electricity production by water-powered turbine generator.

HYDROGEN SULFIDE (H_2S): A malodorous gas made up of hydrogen and sulfur with the characteristic odor of rotten eggs. It is emitted in the natural decomposition of organic matter. H_2S is also a byproduct of refinery activity and the combustion of oil during power plant operations. In heavy concentrations, it can cause illness.

HYDROLOGY: The science dealing with the properties, distribution and circulation of water and snow.

HYDROPOWER: Power produced by falling water.

Write additional "H" words here:

ILLUMINATION OF A SURFACE: The amount of light falling per second on unit area of the surface. Measured in lumens per unit area.

IMPEDANCE: The rate at which a substance can absorb and transmit sound. Also, a unit of alternating current resistence.

IMPLEMENTATION PLAN: A document of the steps to be taken to ensure attainment of environmental quality standards within a specified time period. Implementation plans are required by various laws.

IMPORTS: Energy forms imported from outside the region.

IMPOUNDMENT: A body of water, such as a pond, confined by a dam, dike, floodgate or other barrier.

INCINERATOR: A furnace for burning garbage and other refuse or a controlled apparatus used to burn waste substances and in which all the combustion factors, temperature, retention time, turbulence, and combustion air, can be controlled.

INDUSTRIAL REVOLUTION: The beginning of the system of mass producing most manufactured objects in large factories and distributing and selling them with the help of greatly improved transportation.

INERTIA: A property of matter by which it remains at rest or in uniform motion in the same straight line unless acted upon by some external force.

INFILTRATION: The flow of a fluid into a substance through pores or small openings. Commonly used in hydrology to denote the flow of water into soil material. The movement of air from the exterior of the house or colder portions of the environment, to the interior of the house or warmer areas of the environment. Winter winds blow cold outdoor air into spaces through cracks around windows and doors on the windward side of the house.

INFRARED: A kind of invisible radiation that carries less energy than light.

INSTANTANEOUS PEAK: The maximum demand at the instant of greatest load, usually determined from the readings of indicating or graphic meters.

INSULATION: A substance that insulates is one that can slow down the flow of heat, sound, or electricity.

INTERCHANGE: Kilowatt-hours delivered to or received by one electric utility system from another in times of emergency or shortage for economic purposes. They may be returned in kind at a later time or may be accumulated as energy balances until the end of a stated period. Settlement may be by payment or on a pooling basis.

INTERNAL-COMBUSTION ENGINE: Energy is supplied by a burning fuel which is directly transformed into mechanical energy by controlled combustion, as a gasoline or diesel engine.

INTERRUPTIBLE LOAD: Power made available under agreements which permit curtailment or cessation of delivery by the supplier.

INTERSTATE WATERS: According to law, waters defined as (1) rivers, lakes and other waters that flow across or form a part of state or international boundaries; (2) waters of the Great Lakes; (3) coastal waters whose scope has been defined to include ocean waters seaward to the territorial limits and waters along the coastline (including inland streams) influenced by the tide.

INTERTIE: An interconnection permitting passage of current between two or more electric utility systems.

INVERSION: An atmospheric condition where a layer of cool air is trapped by a layer of warm air so that it cannot rise. Inversions spread polluted air horizontally rather than vertically so that contaminating substances cannot be widely dispersed. An inversion of several days can cause an air pollution episode.

Write additional "I" words here:

j

JOULE: A metric unit of work or energy; the energy produced by a force of one newton operating through a distance of one meter.

Write additional "J" words here:

k

KILO: A prefix indicating 1000; thus a kilovolt (kv) equals 1000 volts and a kilowatt (kw) equals 1000 watts.

KILOCALORIE: Heat energy equal to 4.19 x 10^3 joules.

KILOVOLT (KV): 1,000 volts.

KILOWATT (KW) DEMAND: This is the instantaneous draw of electrical energy that is taken by a facility from a utility company or its own generating facility. The maximum yearly demand is the highest demand for a single month in a year. This can be found on the electric bill. (KW = 1,000 watts.)

KILOWATT: The unit of power equal to 1,000 watts, 3,413 BTU's or 1,341 horsepower. Roughly a power of 1 KW is capable of raising the temperature of a pound (pint) of water 1°F in one second.

KILOWATT-HOUR (KWH): The amount of work or energy delivered during the steady consumption of 1 kilowatt of power for a period of 1 hour, equivalent to 3,412 BTU's.

KINETIC ENERGY: A kind of energy that depends on an object's movement. A car has kinetic energy simply because it is in motion. Kinetic energy is described and measured by the object's mass and speed.

Write additional "K" words here:

l

LEACHING: The process by which soluble materials in the soil, such as nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

LEAD: A heavy metal that may be hazardous to human health if breathed or ingested.

LIFE CYCLE: The phases, changes or stages an organism passes through during its lifetime.

LIFE CYCLE COSTING: Considers direct and indirect costs for the life of the capital investment.

LIFT: In a sanitary landfill, a compacted layer of solid waste and the top layer of cover material.

LIGHT: Radiant energy which an observer can see.

LIGHT ENERGY: The kind of energy that travels as visible radiation.

LIMITING FACTOR: A factor which controls species location and population size, such as shortage of water, food, etc.

LIMNOLOGY: The study of the physical, chemical, meteorological and biological aspects of fresh waters.

LINEAR ACCELERATOR: A long straight tube (or series of tubes) in which charged particles (ordinarily electrons or protons) gain in energy by the action of oscillating electro-magnetic fields.

LITER: The primary standard of capacity in the metric system, equal to the volume of one kilogram of pure water at maximum density, at approximately 4 degrees C., and under normal atmospheric pressure. One liter = 0.264 U.S. gallons, 1.05 U.S. quarts, or 2.11 U.S. pints.

LIQUEFIED NATURAL GAS (LNG): Natural gas that has been changed into a liquid by cooling to about 1/600 of its gaseous volume at normal atmospheric pressure; thus, the cost of shipping and storage is reduced.

LIQUID METAL REACTOR (LMR): A type of nuclear power reactor in which a liquid metal such as sodium flows through the reactor core, is heated, and delivers the heat to produce steam in a separate vessel containing water.

LOAD: The power and energy requirements of users on the electric power system in a designated area or the amount of power delivered to a given point.

LOAD DIVERSITY: The difference between (1) the sum of the separate peak loads of two or more load areas and (2) the actual coincident peak load of the combined areas which occurs when their annual peak loads occur in different seasons of the year. The peak load period for a northeastern section might be winter; for a southern state it might be summer when use of air conditioning is high.

LOAD FACTOR: The ratio of the average load over a designated period to the peak load occurring in that period. In this Glossary, the term applies to annual load factor unless otherwise specified.

LOAD SHAPE (LOAD PATTERN): The characteristic variation in the magnitude of the power load with respect to time. This can be for a daily, weekly, or annual period.

LOOSE INSULATION: Small pieces of insulation which are blown into place.

LOSSES (ELECTRIC SYSTEM): Total electric energy loss in the electric system. It consists of transmission, transformation, and distribution losses and unaccounted for energy losses between sources of supply and points of delivery.

LOW SULFUR COAL AND OIL: Generally, coal or oil that contains one percent or less of sulfur by weight.

Write additional "L" words here:

MAGMA: Molten rock within the earth's interior.

MAGNETIC FIELD: A region in which a magnetic force can be detected.

MANTLE: The semisolid layer of the earth that is between the crust and the core.

MASS: A measure of the weight of matter in an object. The weight of an object depends on its mass.

MATTER: Anything which is solid, liquid, or gaseous.

MAXIMUM DEMAND: The greatest of all of the demands of the load under consideration which has occurred during a specified period of time.

MAXIMUM PLANT CAPABILITY (HYDRO): The maximum load which hydroelectric plants can supply under optimum head and flow conditions without exceeding approved limits on temperature and stress.

Mcf: One thousand cubic feet.

MECHANICAL ENERGY: The kind of energy that is released to make objects move.

MEDIAN STREAM FLOW (MEDIAN HYDRO): The rate of discharge of steam for which there are equal numbers of greater and lesser flow occurrences during a specified period.

MEDIUM: Any material — solid, liquid, gas — in which waves travel.

MEGAWATT (MW): A unit of power equal to 1,000 kilowatts or 1 million watts.

MEGAWATT-HOUR (mwh): One thousand kilowatt-hours.

MEGAWATT MONTH: A unit of energy equal to one megawatt of power flowing continuously for an average month of 30.4 days or 730 hours.

METHANE: Colorless, nonpoisonous and flammable gaseous hydrocarbon. Methane (Ch_4) is emitted by marshes and by dumps undergoing anaerobic decomposition.

mgd: Used to express rate of water flow in millions of gallons per day.

MICROWAVE: In general usage, microwaves refer to radio frequencies whose wave lengths are sufficiently short to exhibit some of the properties of light. Microwaves are usually used in point-to-point communications because they are easily concentrated into a beam. Frequencies of more than 1,000 megahertz are usually considered to be microwave frequencies.

MINE: An opening or excavation in the earth for the purpose of extracting minerals.

MOBILE HOME SKIRT: A foundation piece added to enclose the area under a mobile home.

MODERATOR: A material, such as ordinary water, silver cadmium, boron, or graphite, used in a reactor to slow down high velocity neutrons; thus decreasing the likelihood of further fission.

MOLECULE: The smallest part of a chemical compound that has the characteristics of the compound. The smallest unit quantity of matter which can exist by itself and retain all the properties of the original substance.

MONITORING: Periodic or continuous determination of the amount of pollutants or radioactive contamination present in the environment.

MOTION: Continuous change of location or position of a body.

MULCH: A layer of wood chips, dry leaves, straw, hay, or other material placed on the soil around plants to retain moisture, to prevent weeds from growing and to enrich the soil.

Write additional "M" words here:

n

NATURAL GAS: Naturally-occurring mixtures of hydrocarbon gases and vapors occurring naturally in certain geologic formations; usually found associated with oil.

NATURAL SELECTION: The natural process by which the organisms best adapted to their environment survive and those less well adapted are eliminated.

NEUTRON: An uncharged elementary particle that has a mass nearly equal to that of the proton. Neutrons are present in all known atomic nuclei except the hydrogen nucleus.

NEWTON: The force necessary to give acceleration of one meter per second to one kilogram of mass.

NIGHT (NITE) SET BACK: Automatic controls to bring building into unoccupied status; reduces operational temperature, closes dampers.

NITRIC OXIDE (NO): A gas formed in great part from atmospheric nitrogen and oxygen when combustion takes place at high temperatures and high pressure as in internal combustion engines. NO is not itself a pollutant; however, in the ambient air, it converts to nitrogen dioxide, a major contributor to photochemical smog.

NITROGEN DIOXIDE (NO_2): A compound produced by the oxidation of nitric oxide in the atmosphere; a major contributor to photochemical smog.

NON-FIRM POWER: Power supplied or available under an arrangement which does not have a guarantee of continuous availability. The opposite of FIRM POWER.

NONRENEWABLE RESOURCES: Depletable energy resources such as the fossil fuels — coal, gas and oil.

NUCLEAR ELECTRIC POWER PLANT: One in which heat for raising steam is provided by fission rather than combustion of fossil fuel.

NUCLEAR (ATOMIC) FUEL: Material containing fissionable uranium of such composition and enrichment that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction and produce heat in a controlled manner for process use.

NUCLEAR POWER: Electric power produced from a power plant by converting the energy obtained from nuclear reaction.

NUCLEAR POWER PLANT: Any device, machine, or assembly that converts nuclear energy into some form of useful power, such as mechanical or electrical power. In a nuclear electric power plant, heat produced by a reactor is generally used to make steam to drive a turbine that, in turn, drives an electric generator.

NUCLEAR REACTION: A reaction involving a change in an atomic nucleus, such as fission, fusion, neutron capture, or radioactive decay; as distinct from a chemical reaction, which is limited to changes in electron structure surrounding the nucleus.

NUCLEUS: The dense central core of the atom in which most of the mass and all of the positive charge is concentrated.

NUTRIENT: Elements or compounds essential as raw material for organism growth and development; for example, carbon, oxygen, nitrogen and phosphorus. Classes of nutrients in food are carbohydrates, fats, proteins, vitamins, minerals and water.

Write additional "N" words here:

OFF-PEAK: Energy supplied during periods of relatively low system demands.

OFFSHORE DRILLING: Drilling for oil off the shore of the coast.

OHM: Unit of measure of electrical resistance, or the amount of voltage required to cause a chosen current to flow.

OIL SHALE: A sedimentary rock containing solid organic matter (kerogen) that yields substantial amounts of oil when heated to high temperatures.

OIL SPILL: The accidental discharge of oil into oceans, bays, or inland waterways. Methods of oil spill control include chemical dispersion, combustion, mechanical containment, and absorption.

OMNIVORE: An animal whose food consists of both plant and animal matter.

OPEC (ORGANIZATION OF PETROLEUM EXPORTING COUNTRIES): An organization of countries in the Middle East, North Africa, and South America which aims at developing common oil-marketing policies.

OPEN BURNING: The burning of wastes in an unconfined area.

OPTICAL SPECTRUM: Includes those radiations, commonly called light, that can be detected visually. They are a type of electromagnetic radiation.

ORGANISM: Any living thing.

ORIENTATION: Position with relation to the compass.

OUTAGE: In a power system, the state of a component (such as a generating unit or transmission line) when it is not available to perform its function due to some event directly associated with the component.

OUTFALL: The mouth of a sewer, drain or conduit where an effluent is discharged into the receiving waters.

OUTPUT: The amount of power and energy delivered from a generating station or stations during a specified period.

OXIDANT: Any oxygen-containing substance that reacts chemically in the air to produce new substances. Oxidants are the primary contributors to photochemical smog.

OXIDATION: A chemical reaction in which oxygen unites or combines with other elements. Organic matter is oxidized by the action of aerobic bacteria; oxidation is used in waste water treatment to break down organic wastes.

OZONE (O_3): The kind of oxygen that has three atoms in each molecule. A pungent, colorless, toxic gas. Ozone is one component of photochemical smog and is considered a major air pollutant.

Write additional "O" words here:

P

PARTICULATES: Finely divided solid or liquid particles in the air or in an emission. Particulates include dust, smoke, fumes, mist, spray and fog.

PAYBACK PERIOD: The time it takes for expected energy savings to recover the cost of investment; also called recovery rate.

PEAK LOAD: Literally, the maximum load in a stated period of time. Sometimes the term is used in a general sense to describe that portion of the load above the base load.

PEAKING: Power plant operation to meet the highest portion of the daily load.

PEAKING CAPABILITY: The maximum peak load that can be supplied by a generating unit, station, or system in a stated period of time. For a hydroproject the peaking capability would be equal to the maximum plant capability only under favorable pool and flow conditions. Often the peaking capability may be less due to reservoir drawdown or tail water encroachment.

PETROLEUM: A naturally-occuring material (gaseous, liquid, or solid) composed mainly of chemical compounds of carbon and hydrogen. Fractional distillation yields gasoline, diesel, lubricating oil and other products.

pH: A way of expressing both acidity and alkalinity on a scale of 0-14, with 7 representing neutrality, numbers less than 7 increasing acidity and numbers greater than 7 increasing alkalinity.

PHASE: A condition of matter. The position and motion of particle of a wave.

PHOTOCHEMICAL SMOG: Air pollution associated with oxidants rather than with sulfur oxide, particulates, etc. Produces necrosis, chlorosis and growth alterations in plants and is an eye and respiratory irritant in humans. The pollution created when nitric oxide hydrocarbons, and oxygen react in the sunshine.

PHOTOSYNTHESIS: The process by which some plants make food with the help of sunlight energy (the food is a sugar called glucose; oxygen gas is also produced during photsynthesis); the process in which sunlight falling on green plants causes carbon dioxide and water to be converted into more complex organic materials such as glucose.

PLENUM: A large duct used as a distributor of air from a furnace.

PLUTONIUM: A fissionable element, artificially produced by a neutron capture by U-238.

POINT SOURCE: In air pollution, a stationary source of a large individual emission, generally of an industrial nature. This is a general definition; point source is legally and precisely defined in Federal regulations. See AREA SOURCE.

POLLUTION: The presence of matter or energy whose nature, location or quantity produces undesired effects upon the normally existing environment.

POTENTIAL ENERGY (ELECTRICAL): The amount of voltage that would be necessary to carry an electrical current from one point to another.

POTENTIAL ENERGY (GRAVITATIONAL): The amount of energy that could be released by an object falling, such as water on top of a dam.

POWER: The time rate at which work is done. If an amount of work (W) is done in time (t) the power or rate of doing work is P = W/t.

POWER POOL: A power pool is two or more electric systems interconnected and coordinated to supply power in the most economical manner for their combined load requirements and maintenance.

PPM: Parts per million. The unit commonly used to represent the degree of pollutant concentration where the concentrations are small. Larger concentrations are given in percentages. Thus BOD is represented in ppm while suspended solids in water are expressed in percentages. In air, ppm is usually a volume/volume ratio; in water, a weight/volume ratio.

PREFERENCE CUSTOMERS. In accordance with congressional directives, cooperatives and public bodies (states, public utility districts, counties, municipalities, and federal customers) have preferential rights to federally generated hydro electrical power. These customers fall into two categories: (a) those that have no generating facilities of their own or other sources of power supply; and (b) those that supplement their own power resources with purchases from a federal system such as the Bonneville Power Administration.

PRESSURE: The force applied to a unit area.

PRIME ENERGY: Hydroelectric energy which is assumed to be available 100 percent of the time; specifically, the average energy generated during the critical period.

PRIVATE UTILITY: A utility owned by stock holders.

PROTON: An elementary particle having a positive charge equivalent to the negative charge of the electron but possessing a mass approximately 1,837 times as great. The proton is, in effect, the positive nucleus of the hydrogen atom.

PUBLIC UTILITY: A corporation of a state with territorial boundaries embracing an area wider than a single municipality (incorporated as well as unincorporated) and frequently covering more than one county for the purpose of generating, transmitting and distributing electric power and energy.

PUMPED HYDROELECTRIC STORAGE: The only means now available for the large scale storage of electrical energy. Excess electricity produced during period of low demand is used to pump water up to a reservoir. When demand is high, the water is released to operate a hydroelectric generator. Pumped energy storage only returns about 66 percent of the electrical energy put into it, but costs less than an equivalent generating capacity.

PUMPED STORAGE PLANT: A hydroelectric power plant which generates electric energy for peak load use by utilizing water pumped into an elevated storage reservoir during off-peak periods.

Write additional "P" words here:

r

R-VALUE OR R-FACTOR: Resistance to heat flow, used with specific materials such as glass, wood, concrete block. The higher the R, the better the insulation.

RADIATION: The emission and propagation of energy through space or through a medium in the form of waves.

RECLAMATION: Act or process of reclaiming; for example, strip mined land should be reclaimed-replanted and leveled.

RECYCLE: To process (as liquid body waste, cans, glass, newspapers) in order to regain new material for human use.

REFLECTION: The turning back of a wave from the boundary of a medium.

REFUSE: See SOLID WASTE.

REFUSE RECLAMATION: The collection and process of converting solid waste to saleable products. For example, the composting of organic solid waste.

REM (ROENTGEN EQUIVALENT MAN): Often used interchangeably with **rad.** A measure of the amount of radiation absorbed by the body. Various kinds of radiation differ in their effectiveness in causing biological damage.

RENEWABLE RESOURCES: Nondepletable resources; for example, the sun.

RESERVES: The amount of a natural resource known to exist and expected to be recovered by present-day techniques and under present economic conditions.

RESERVOIR: A pond, lake, tank, or basin—natural or manmade—used for the storage, regulation, and control of water.

RESOURCES: The estimated total quantity of a natural resource such as minerals in the ground; includes undiscovered mineral reserves.

RESISTANCE: That character of a conductor that impedes the flow of an electric current. Unit of measure is "ohms".

REUSE: To use again, as in returnable soft drink bottles, or scraps of old clothes used in a quilt.

RSSF (RETRIEVABLE SURFACE STORAGE FCILITY): A place for burying unwanted radioactive materials to prevent radiation escape; earth or water acting as a shield. Such materials must be placed in watertight, noncorrodible containers so the radioactive material cannot leak out and invade underground water supplies.

Write additonal "R" words here:

S

SALINITY: The degree of salt in water.

SCRAP: Discarded or rejected materials that result from manufacturing or fabricating operations and are suitable for reprocessing.

SECOND LAW OF THERMODYNAMICS: One of the two "limit" laws which govern the conversion of energy. Referred to here as the "heat tax," it can be stated in several equivalent forms, all of which describe the inevitable passage of some energy from a useful to a less useful form in any energy conversion.

SECONDARY ENERGY: All hydroelectric energy other than prime energy; specifically the difference between average annual energy and prime energy.

SHELL: The roof or cover of a home, the foundation or part that sits on the ground, and the sides which join the two.

SILTATION: The depositing of finely divided soil and rock particles upon the gravel of stream and riverbeds.

SIMPLE MACHINE: A contrivance for the transfer of energy and for increased convenience in the performance of work.

SIMPLE PAYBACK: The length of time required for an investment to pay for itself; not adjusted for fuel price escalation.

SNOWPACK: The winter accumulation of snow in mountain areas which will melt and run off into streams and rivers.

SOLAR CELL: An electric cell which converts radiant energy from the sun into electrical energy.

SOLAR ENERGY: Radiation energy from the sun falling upon the earth's surface.

SOLID: A state of matter in which the relative motion of the molecules is restricted and they tend to retain a definite fixed position relative to each other, giving rise to crystal structure. A solid may be said to have a definite shape and volume.

SOLID WASTE: Useless, unwanted, or discarded materials with insufficient liquid content to be free flowing.

SOUND ENERGY: A kind of energy carried by molecules that vibrate back and forth so that waves are formed.

SPECIFIC HEAT: The heat capacity of a material per unit mass.

SPEED: Time rate of motion measured by the distance moved over a unit of time.

SPILLWAY: The channel or passageway around or over a dam through which excess water is diverted.

STABLE AIR: An air mass that remains in the same position rather than moving in its normal horizontal and vertical direction. Stable air does not disperse pollutants and can lead to high buildups of air pollution.

STAGNATION: Lack of wind in an air mass or lack of motion in water. Both cases tend to entrap and concentrate pollutants.

STATIC ELECTRICITY: Electricity at rest.

STEAM-ELECTRIC PLANT: A plant in which the prime movers (turbines) connected to the generators are driven by steam.

STOCKPILE: A storage pile or reserve supply of an essential raw material. For example, coal is stockpiled in the open air for storage purposes.

STORAGE CELL: An electrochemical cell in which the reacting materials are renewed by the use of a reverse current from an external source; for example, an automobile storage battery.

STORM DOOR: Additional door with an air space between it and the existing door.

STORM WINDOW: Additional window with an air space between it and the existing window. Storm windows will cut in half the heat that passes through windows in your house.

STRIP-MINING: A process in which rock and top soil strata overlying ore or fuel deposits are scraped away by mechanical shovels. Also known as surface mining.

SUBLIMINATION: The change of phase from a solid directly to a vapor or gas.

SUBSTATION: An electrical power station which serves as a control and transfer point in an electrical transmission system.

SUPERFLYWHEEL: A flywheel of the future that will be constructed of materials which have special properties along each axis. See also FLYWHEEL.

SUPERTANKERS: Extremely large oil tankers that can hold up to four million barrels (170 million gallons) of oil. The largest ones will require deep-water ports.

SYNTHETIC: Man-made.

Write additional "S" words here:

t

TAR SAND: Any sedimentary material that contains bitumen or other heavy petroleum material that cannot be recovered by conventional petroleum recovery methods.

TECHNOLOGY: Applied science.

TEMPERATURE: The degree of hotness or coldness measured on a definite scale. Specifically, the temperature of a substance is a manifestation of the speed of molecular movement caused by the relative amount of heat agitation.

TENSILE STRENGTH: The greatest longitudinal stress a substance can bear without tearing apart.

THERM: A unit of gas fuel containing 100,000 BTUs.

THERMAL BARRIER: A strip of nonconducting material such as wood, vinyl, or foam rubber, separating the inside and outside surfaces to stop conduction of heat to the outside and resulting cold surfaces inside.

THERMAL EFFICIENCY: The ratio of the electric power produced by a power plant to the amount of heat produced by the fuel; a measure of efficiency with which the plant converts thermal to electrical energy. Commonly about 35%.

THERMAL ENERGY: The total potential and kinetic energy associated with the random motions of the particles of a material.

THERMAL PLANT: A generating plant which converts heat energy to electrical energy. Such plants may burn coal, oil, or use nuclear energy to produce thermal energy.

THERMAL POLLUTION: Degradation of water quality by the introduction of a heated effluent. Primarily a result of the discharge of cooling waters from industrial processes, particularly from electrical power generation. Also "waste heat" which eventually results from virtually every energy conversion.

THERMAL REACTOR: A nuclear reactor in which the chain reaction is sustained primarily by thermal neutrons. Most commercial nuclear reactors are thermal reactors.

THERMODYNAMICS: The science and study of the relationship between heat and mechanical work.

THERMOSTAT: An instrument employed to maintain a constant temperature.

TOXICITY: The degree of being poisonous or harmful to plant or animal life.

TRANSFORMER: A device which can increase or decrease the voltage of an alternating current.

TRANSMISSION: The act or process of transporting electric energy in bulk from a source or sources of supply to other utility systems. Done at high voltage to reduce loss.

TRANSMISSION LINES: Wires or cables through which high voltage electric power is moved from point to point.

TROPOSPHERE: The layer of the atmosphere extending seven to ten miles above the earth. Vital to life on earth, it contains clouds and moisture that reach the earth as rain or snow. Temperature decreases as altitude increases in the troposphere. Storms and vertical air currents and clouds occur almost entirely in the troposphere.

TURBINE: A motor, the shaft of which is rotated by a stream of water, steam, air or fluid from a nozzle and forced against blades of a wheel.

TURBOGENERATOR: An electric generator powered by a gas jet or steam turbine engine. The steam is created by heat from combustible materials (coal, oil, natural gas or other) or from a heat source beneath the earth's surface (geothermal).

Write additional "T" words here:

U

U VALUE (THERMAL TRANSMITTANCE): Overall coefficient of heat transmission (air to air) expressed in BTUs per square foot per degree F. It is the time rate of heat flow. The "U" value applies to combinations of different materials used in series along the heat path flow, materials, air spaces, and surface air films on both sides. The lower the "U" value, the less heat transferred.

UNIT TRAIN: An ore shuttle that carries coal nonstop from mine to power plant.

Write additional "U" words here:

VAPOR BARRIER: A part of the insulation system in a residential or commerical structure. Vapor barriers prevent moisture from accumulating and causing rot in wood framing.

VAPORIZATION: The change of a substance from a liquid or solid state to the gaseous state. One of three contributing factors to air pollution; the others are attrition and combustion.

VARIANCE: Sanction granted by a governing body for delay or exception in the application of a given law, ordinance or regulation.

VELOCITY: Time rate of motion in a fixed direction.

VOLATILE: Readily vaporizable at relatively low temperature. Explosive. Characterized by rapid change.

VOLT: Unit of force pressure which moves electrical energy through a conductor.

VOLTAGE: The amount of force emplyed to move a quantity of electricity; measured in volts.

Write additional "V" words here:

V

VALENCE ELECTRONS OF THE ATOM: Electrons which are gained, lost, or shared in chemical reactions.

VAPOR: The words vapor and gas are often used interchangeably. Vapor is more frequently used for a substance which, though present in the gaseous phase, generally exists as a solid or liquid at room temperature. Gas is more frequently used for a substance that generally exists in the gaseous phase at room temperature.

W

WATER POLLUTION: The addition of sewage, industrial and institutional wastes or other harmful or objectionable material to water in concentration or in sufficient quantities to result in measurable degradation of water quality.

WATER QUALITY STANDARD: A plan for water quality management containing four major elements: the use (recreation, drinking water, fish and wildlife propagation, industrial or agricultural) to be made of the water; criteria to protect those uses; implementation plans (for needed industrial municipal waste treatment improvements) and enforcement plans; and an anti-degradation statement to protect existing high quality waters.

WATERSHED: The area drained by a given stream.

WATER SUPPLY SYSTEM: The system for the collection, storage, treatment and distribution of potable water from the sources of supply to the consumer.

WATER VAPOR: Water in the form of a gas.

WATT (W): A unit of measure for electrical power equal to the transfer of one joule of energy per second. The watt is the unit of power most often associated with electricity (1 horsepower = 746 watts) determined by multiplying required volts by required amperes (volts × amps = watts). A toaster is commonly 1,000 watts.

WATT HOUR: The amount of electricity used by one watt in one hour. A 100 watt light bulb will use 100 watt-hours of electricity every hour it is in use.

WEATHERSTRIPPING: Reduces the rate of air infiltration by making sure that all doors and windows fit their frames snugly.

WEIGHT: The measure of the gravitational force acting on a substance.

WINDOW TREATMENTS: Applications to the interior side of windows—blinds, shades, sutters, draperies.

WORK: A force acting against resistance to produce motion in a body; measured by the product of the force acting and the distance moved through against the resistance.

Write additional "W" words here:

X

X-RAYS: A type of radiation of higher frequency than visible light but lower than gamma rays. Usually produced by high energy electrons striking a metal target.

Write additional "X" words here:

Z

ZONE CONTROL: Independent temperature control for each area to be heated and cooled with appropriate distribution control.

Write additional "Z" words here:

CONVERSION FACTORS OF ENERGY/POWER

TABLE I: ENERGY

1 electron-volt (eV) =	1 million electron-volts (MeV) =	1 joule (J) =	1 calorie (cal) =
1 eV	10^{6} eV	6.241×10^{18} eV	2.611×10^{19} eV
10^{-6} MeV	1 MeV	6.241×10^{12} MeV	2.611×10^{13} MeV
1.602×10^{-19} J	1.602×10^{-13} J	1 J	4.184 J
3.829×10^{-20} cal	3.829×10^{-14} cal	0.239 cal	1 cal
1.52×10^{-22} BTU	1.52×10^{-16} BTU	9.485×10^{-4} BTU	3.968×10^{-3} BTU
3.829×10^{-23} kcal	3.829×10^{-17} kcal	2.39×10^{-4} kcal	0.001 kcal
4.451×10^{-26} kWh	4.451×10^{-20} kWh	2.778×10^{-7} kWh	1.162×10^{-6} kWh
1.52×10^{-28} MBTU	1.52×10^{-22} MBTU	9.485×10^{-10} MBTU	3.968×10^{-9} MBTU
1.854×10^{-30} MW-day	1.854×10^{-24} MW-day	1.157×10^{-11} MW-day	4.843×10^{-11} MW-day
5.077×10^{-33} MW-yr	5.077×10^{-27} MW-yr	3.169×10^{-14} MW-yr	1.326×10^{-13} MW-yr
1.52×10^{-37} mQ	1.52×10^{-31} mQ	9.485×10^{-19} mQ	3.968×10^{-18} mQ
1.52×10^{-40} Q	1.52×10^{-34} Q	9.485×10^{-22} Q	3.968×10^{-21} Q

1 British Thermal Unit (BTU) =	1 kilocalorie (kcal or Cal) =	1 kilowatt-hour (kWh) =	1 million BTU (MBTU) =
6.581×10^{21} eV	2.611×10^{22} eV	2.247×10^{25} eV	6.581×10^{27} eV
6.581×10^{15} MeV	2.611×10^{16} MeV	2.247×10^{19} MeV	6.581×10^{21} MeV
1054 J	4184 J	3.6×10^{6} J	1.054×10^{9} J
252 cal	1000 cal	8.604×10^{5} cal	2.52×10^{8} cal
1 BTU	3.968 BTU	3413 BTU	10^{6} BTU
0.252 kcal	1 kcal	860.4 kcal	2.52×10^{5} kcal
2.929×10^{-4} kWh	1.162×10^{-3} kWh	1 kWh	292.9 kWh
10^{-6} MBTU	3.968×10^{-6} MBTU	3.413×10^{-3} MBTU	1 MBTU
1.22×10^{-8} MW-day	4.843×10^{-8} MW-day	1.167×10^{-5} MW-day	0.0122 MW-day
3.341×10^{-11} MW-yr	1.326×10^{-10} MW-yr	1.141×10^{-7} MW-yr	3.341×10^{-5} MW-yr
10^{-15} mQ	3.968×10^{-15} mQ	3.413×10^{-12} mQ	10^{-9} mQ
10^{-18} Q	3.968×10^{-18} Q	3.413×10^{-15} Q	10^{-12} Q

1 megawatt-day (MW-day) =	1 megawatt-year (MW-yr) =	1 milli-Q (mQ) =	1 Q =
5.393×10^{29} eV	1.97×10^{32} eV	6.581×10^{36} eV	6.581×10^{39} eV
5.393×10^{23} MeV	1.97×10^{26} MeV	6.581×10^{30} MeV	6.581×10^{33} MeV
8.64×10^{10} J	3.156×10^{13} J	1.054×10^{18} J	1.054×10^{21} J
2.065×10^{10} cal	7.542×10^{12} cal	2.52×10^{17} cal	2.52×10^{20} cal
8.195×10^{7} BTU	2.993×10^{10} BTU	10^{15} BTU	10^{18} BTU
2.065×10^{7} kcal	7.542×10^{9} kcal	2.52×10^{14} kcal	2.52×10^{17} kcal
2.4×10^{4} kWh	8.766×10^{6} kWh	2.929×10^{11} kWh	2.929×10^{14} kWh
81.95 MBTU	2.993×10^{4} MBTU	10^{9} MBTU	10^{12} MBTU
1 MW-day	365.2 MW-day	1.22×10^{7} MW-day	1.22×10^{10} MW-day
2.738×10^{-3} MW-yr	1 MW-yr	3.341×10^{4} MW-yr	3.341×10^{7} MW-yr
8.195×10^{-8} mQ	2.993×10^{-5} mQ	1 mQ	1000 mQ
8.195×10^{-11} Q	2.993×10^{-8} Q	0.001 Q	1 Q

Other units of energy:

1 erg = 10^{-7} J

1 foot-pound (ft-lb) = 1.356 J

1 therm = 10^{5} BTU, often used in reporting sales of natural gas. (1 therm is almost exactly the energy content of 100 cubic feet of natural gas.)

1 kiloton = 10^{12} cal = 4.184×10^{12} J, approximately the energy released in the explosion of 1000 tons of TNT. The kiloton (and the megaton) are frequently used in referring to A-bomb and H-bomb explosions.

1 horsepower-hour (hp-hr) = 0.746 kWh = 2.686×10^{6} J, the energy delivered by 1 hp acting for 1 hour.

TABLE II: POWER

1 BTU per day =	1 kilowatt-hour per year (kWh/yr) =	1 watt (W) =	1 kilowatt (kW) =
1 BTU/day	9.348 BTU/day	81.95 BTU/day	8.195×10^{4} BTU/day
0.107 kWh/yr	1 kWh/yr	8.766 kWh/yr	8766 kWh/yr
0.0122 W	0.1141 W	1 W	1000 W
1.22×10^{-3} kW	1.141×10^{-4} kW	0.001 kW	1 kW
1.22×10^{-6} MW	1.141×10^{-7} MW	10^{-6} MW	0.001 MW
1.22×10^{-11} GW	1.141×10^{-10} GW	10^{-9} GW	10^{-6} GW
3.652×10^{-13} mQ/yr	3.413×10^{-12} mQ/yr	2.993×10^{-11} mQ/yr	2.993×10^{-8} mQ/yr
3.652×10^{-16} Q/yr	3.413×10^{-15} Q/yr	2.993×10^{-14} Q/yr	2.993×10^{-11} Q/yr

1 megawatt (MW) =	1 gigawatt (GW) =	1 milli-Q per year (mQ/yr) =	1 Q per year (Q/yr) =
8.195×10^{7} BTU/day	8.195×10^{10} BTU/day	2.738×10^{12} BTU/day	2.738×10^{15} BTU/day
8.766×10^{6} kWh/yr	8.766×10^{9} kWh/yr	2.929×10^{11} kWh/yr	2.929×10^{14} kWh/yr
10^{6} W	10^{9} W	3.341×10^{10} W	3.341×10^{13} W
1000 kW	10^{6} kW	3.341×10^{7} kW	3.341×10^{10} kW
1 MW	1000 MW	3.341×10^{4} MW	3.341×10^{7} MW
0.001 GW	1 GW	33.41 GW	3.341×10^{4} GW
2.993×10^{-5} mQ/yr	2.993×10^{-2} mQ/yr	1 mQ/yr	1000 mQ/yr
2.993×10^{-8} Q/yr	2.993×10^{-5} Q/yr	0.001 Q/yr	1 Q/yr

Other units of power: 1 horsepower (hp) = 746 W.

TABLE III: TEMPERATURE

Temperature intervals

1°C (Celsius or centigrade) = 1°K (Kelvin or absolute)
= 1.8°F (Fahrenheit)

$$1°F = \tfrac{5}{9}°K = \tfrac{5}{9}°C.$$

Correspondence between temperature scales

On the various scales, the normal freezing point of water is: 32°F = 0°C = 273.15°K.

Absolute or Kelvin temperatures are often written without the ° symbol and read as "kelvins." Thus the normal freezing point of water is 273.15 K or 273.15 kelvins.

Conversions between temperature scales

From the relationships between the temperature intervals and the given values of the freezing point of water, it follows that:

$$T\,(°F) = 32 + 1.8 \times T(°C)$$
$$T\,(°C) = \tfrac{5}{9} \times [T(°F) - 32]$$
$$T\,(°K) = 273.15 + T(°C)$$

	°C	°F	°K
Absolute zero	−273.15	−459.67	0
Normal freezing point of water	0	32	273.15
Normal boiling point of water	100	212	373.15

TABLE IV: VOLUME

1 cubic centimeter (cm^3 or cc) =	1 cubic inch ($in.^3$) =	1 liter (l) =
1 cm^3	16.39 cm^3	1000 cm^3
6.102×10^{-2} $in.^3$	1 $in.^3$	61.02 $in.^3$
0.001 liter	1.639×10^{-2} liter	1 liter
2.642×10^{-4} gal	4.329×10^{-3} gal	0.2642 gal
3.531×10^{-5} ft^3	5.787×10^{-4} ft^3	3.531×10^{-2} ft^3
6.29×10^{-6} barrel	1.031×10^{-4} barrel	6.29×10^{-3} barrel
10^{-6} m^3	1.639×10^{-5} m^3	0.001 m^3
10^{-15} km^3	1.639×10^{-14} km^3	10^{-12} km^3
2.399×10^{-16} $mile^3$	3.931×10^{-15} $mile^3$	2.399×10^{-13} $mile^3$

1 gallon (gal) =	1 cubic foot (ft^3) =	1 barrel (bbl) =
3785 cm^3	2.832×10^4 cm^3	1.59×10^5 cm^3
231 $in.^3$	1728 $in.^3$	9702 $in.^3$
3.785 liters	28.32 liters	159 liters
1 gal	7.481 gal	42 gal
0.1337 ft^3	1 ft^3	5.615 ft^3
2.381×10^{-2} barrel	0.1781 barrel	1 barrel
3.785×10^{-3} m^3	2.832×10^{-2} m^3	0.159 m^3
3.785×10^{-12} km^3	2.832×10^{-11} km^3	1.59×10^{-10} km^3
9.082×10^{-13} $mile^3$	6.794×10^{-12} $mile^3$	3.814×10^{-11} $mile^3$

1 cubic meter (m^3) =	1 cubic kilometer (km^3) =	1 cubic mile ($mile^3$) =
10^6 cm^3	10^{15} cm^3	4.168×10^{15} cm^3
6.102×10^4 $in.^3$	6.102×10^{13} $in.^3$	2.544×10^{14} $in.^3$
1000 liters	10^{12} liters	4.168×10^{12} liters
264.2 gal	2.642×10^{11} gal	1.101×10^{12} gal
35.31 ft^3	3.531×10^{10} ft^3	1.472×10^{11} ft^3
6.29 barrels	6.29×10^9 barrels	2.622×10^{10} barrels
1 m^3	10^9 m^3	4.168×10^9 m^3
10^{-9} km^3	1 km^3	4.168 km^3
2.399×10^{-10} $mile^3$	0.2399 $mile^3$	1 $mile^3$

Other units of volume:

1 British gallon = 1.2 U.S. gal

1 cord (of wood) = 128 ft^3

1 acre-foot = 1233 m^3, often used in measuring quantities of water. (1 acre-foot is the volume of water that covers an area of 1 acre to a depth of 1 ft.)

1 quart = 1/4 gal = 0.9464 liter; 1 pint = 1/2 qt = 0.4732 liter. The pint, quart and gallon are U.S. units of *liquid* measurement; different "dry" measures are occasionally used.

The barrel used here is the 42-gallon barrel used in measuring petroleum; many other sizes of "barrels" are in use for other special purposes.

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